

In the Claims:

Please cancel claims 15-17 and 24, without prejudice, and amend claims 1-4, 7-11, 14 and 18-21 as follows:

1. (Currently amended) An information recording and reproducing apparatus for recording and reproducing information onto/from a magnetic recording medium, comprising:

a data recording unit which inserts a predetermined specific code train into at least one or more portions of user data and records the data onto the medium upon data recording; and

a data reproducing unit which separates a head reproducing signal having an amplitude by using clocks and thereafter, ~~executes a clock extraction and an amplitude correction by using a signal corresponding to said specific code train upon data reproduction~~ on the basis of phase information of two or more known revise bytes positioned on both sides of data, phase errors of signal points of data existing among the points of data are estimated, thereby correcting the amplitude into an amplitude value of an original timing signal point.

2. (Currently amended) An information recording and reproducing apparatus for recording and reproducing information onto/from a magnetic recording medium, comprising:

a data recording unit which inserts a predetermined specific code train into at least two or more portions including head and last portions of data and records the data onto the medium upon data recording; and

a data reproducing unit which separates a head reproducing signal having an amplitude by using clocks and thereafter, ~~executes a clock extraction and an amplitude correction by using a signal corresponding to said specific code train upon data reproduction~~ on the basis of phase information of two or more known revise bytes positioned on both sides of data, phase errors of signal points of data existing among the points of data are estimated, thereby correcting the amplitude into an amplitude value of an original timing signal point,

wherein said data recording unit and said data reproducing unit record and, thereafter, reproduce user data onto/from the medium without encoding it to an RLL code.

3. (Currently Amended) An apparatus according to claim 1, wherein ~~in the clock extraction by said data reproducing unit,~~ unit obtains an inherent sampling time is ~~obtained~~ on the basis of phase information extracted from ~~the~~ a signal corresponding to said specific code train, and ~~the~~ a signal amplitude synchronized with one of the clock ~~clocks~~ is

sampled again by an interpolating operation of an interpolating filter according to said sampling time.

4. (Currently amended) An information recording and reproducing apparatus for recording and reproducing information onto/from a magnetic recording medium, comprising:

a data recording unit which inserts a predetermined specific code train into at least two or more portions including head and last portions of data and records the data onto the medium upon data recording; and

a data reproducing unit which separates a head reproducing signal having an amplitude by using clocks and thereafter, ~~executes a clock extraction and an amplitude correction by using a signal corresponding to said specific code train upon data reproduction~~ on the basis of phase information of two or more known revise bytes positioned on both sides of data, phase errors of signal points of data existing among the points of data are estimated, thereby correcting the amplitude into an amplitude value of an original timing signal point,

wherein said data recording unit arranges sync bytes to the head position of each data which was split by said specific code train and records the data onto the medium, and said data reproducing unit detects sync bytes subsequent to said specific code train, presumes a head bit of the data, and obtains a synchronization of a decoding.

5. (Original) An apparatus according to claim 1, wherein said data recording unit inserts sync bytes into said specific code train and records the data onto the medium, and said data reproducing unit detects the sync bytes from said specific code train, presumes a head bit of the data, and obtains a synchronization of a decoding.

6. (Previously Presented) An information recording and reproducing apparatus for recording and reproducing information onto/from a magnetic recording medium, comprising:

a data recording unit which inserts a predetermined specific code train into at least two or more portions including head and last portions of data and records the data onto the medium upon data recording; and

a data reproducing unit which separates a head reproducing signal by using clocks and thereafter, executes a clock extraction and an amplitude correction by using a signal corresponding to said specific code train upon data reproduction,

wherein said data reproducing unit obtains a signal mean value and a standard deviation and an autocorrelation of noises by using the signal corresponding to said specific code train and uses them in a likelihood calculation of a data decoding.

7. (Currently amended) An information recording and reproducing apparatus for recording and reproducing information onto/from a magnetic recording medium, comprising:

a data recording unit which inserts a predetermined specific code train into at least two or more portions including head and last portions of data and records the data onto the medium upon data recording; and

a data reproducing unit which separates a head reproducing signal having an amplitude by using clocks and thereafter, ~~executes a clock extraction and an amplitude correction by using a signal corresponding to said specific code train upon data reproduction~~ on the basis of phase information of two or more known revise bytes positioned on both sides of data, phase errors of signal points of data existing among the points of data are estimated, thereby correcting the amplitude into an amplitude value of an original timing signal point,

wherein said data recording unit and said data reproducing unit are constructed by a signal processing integrated circuit and said signal processing integrated circuit is installed in a magnetic disk apparatus or an optical disk apparatus.

8. (Currently amended) A signal decoding circuit for recording and reproducing information onto/from a magnetic recording medium, comprising:

a data recording unit which inserts a predetermined specific code train into at least one or more portions of user data and records the data onto the medium upon data recording; and

a data reproducing unit which separates a head reproducing signal having an amplitude by using clocks and thereafter, ~~executes a clock extraction and an amplitude correction by using a signal corresponding to said specific code train upon data reproduction~~ on the basis of phase information of two or more known revise bytes positioned on both sides of data, phase errors of signal points of data existing among the points of data are estimated, thereby correcting the amplitude into an amplitude value of an original timing signal point.

9. (Currently amended) A signal decoding circuit for recording and reproducing information onto/from a magnetic recording medium, comprising:

a data recording unit which inserts a predetermined specific code train into at least two or more portions including head and last portions of data and records the data onto the medium upon data recording; and

a data reproducing unit which separates a head reproducing signal having an amplitude by using clocks and thereafter, ~~executes a clock extraction and an amplitude correction by using a signal corresponding to said specific code train upon data reproduction~~ on the basis of phase information of two or more known revise bytes positioned

on both sides of data, phase errors of signal points of data existing among the points of data are estimated, thereby correcting the amplitude into an amplitude value of an original timing signal point,

wherein said data recording unit and said data reproducing unit record and, thereafter, reproduce user data onto/from the medium without encoding it to an RLL code.

10. (Currently Amended) A circuit according to claim 8, wherein in the clock extraction by said data reproducing unit, an inherent sampling time is obtained on the basis of phase information extracted from the signal corresponding to said specific code train, and ~~the~~a signal amplitude synchronized with the clock is sampled again by an interpolating operation of an interpolating filter according to said sampling time.

11. (Currently amended) A signal decoding circuit for recording and reproducing information onto/from a magnetic recording medium, comprising:

a data recording unit which inserts a predetermined specific code train into at least two or more portions including head and last portions of data and records the data onto the medium upon data recording; and

a data reproducing unit which separates a head reproducing signal having an amplitude by using clocks and thereafter, ~~executes a clock extraction and an amplitude correction by using a signal corresponding to said specific code train upon data~~

reproduction on the basis of phase information of two or more known revise bytes positioned on both sides of data, phase errors of signal points of data existing among the points of data are estimated, thereby correcting the amplitude into an amplitude value of an original timing signal point,

wherein said data recording unit arranges sync bytes to the head position of each data which was split by said specific code train and records the data onto the medium, and said data reproducing unit detects sync bytes subsequent to said specific code train, presumes a head bit of the data, and obtains a synchronization of a decoding.

12. (Original) A circuit according to claim 8, wherein said data recording unit inserts sync bytes into said specific code train and records the data onto the medium, and said data reproducing unit detects the sync bytes from said specific code train, presumes a head bit of the data, and obtains a synchronization of a decoding.

13. (Previously Presented) A signal decoding circuit for recording and reproducing information onto/from a magnetic recording medium, comprising:

a data recording unit which inserts a predetermined specific code train into at least two or more portions including head and last portions of data and records the data onto the medium upon data recording; and



a data reproducing unit which separates a head reproducing signal by using clocks and thereafter, executes a clock extraction and an amplitude correction by using a signal corresponding to said specific code train upon data reproduction,

wherein said data reproducing unit obtains a signal mean value and a standard deviation and an autocorrelation of noises by using the signal corresponding to said specific code train and uses them in a likelihood calculation of a data decoding.

14. (Currently amended) A signal decoding circuit for recording and reproducing information onto/from a magnetic recording medium, comprising:

a data recording unit which inserts a predetermined specific code train into at least two or more portions including head and last portions of data and records the data onto the medium upon data recording; and

a data reproducing unit which separates a head reproducing signal having an amplitude by using clocks and thereafter, ~~executes a clock extraction and an amplitude correction by using a signal corresponding to said specific code train upon data reproduction~~ on the basis of phase information of two or more known revise bytes positioned on both sides of data, phase errors of signal points of data existing among the points of data are estimated, thereby correcting the amplitude into an amplitude value of an original timing signal point,

wherein said data recording unit and said data reproducing unit are constructed by a signal processing integrated circuit and said signal processing integrated circuit is installed in a magnetic disk apparatus or an optical disk apparatus.

15-17. (Cancelled)

18. (Currently Amended) An information recording and reproducing method of recording and reproducing information onto/from a magnetic recording medium, comprising the steps of:

inserting a predetermined specific code train into at least one or more portions of user data and recording the data onto the medium upon data recording; and

separating a head reproduced signal having an amplitude by using clocks and, thereafter, ~~executing a clock extraction and an amplitude correction by using a signal corresponding to said specific code train upon data reproduction~~ on the basis of phase information of two or more known revise bytes positioned on both sides of data, estimating phase errors of signal points of data existing among the points of data, thereby correcting the amplitude into an amplitude value of an original timing signal point.

19. (Currently Amended) An information recording and reproducing method of recording and reproducing information onto/from a magnetic recording medium, comprising the steps of:

inserting a predetermined specific code train into at least two or more portions including head and last portions of data and recording the data onto the medium upon data recording; and

separating a head reproduced signal having an amplitude by using clocks and, thereafter, ~~executing a clock extraction and an amplitude correction by using a signal corresponding to said specific code train upon data reproduction~~ on the basis of phase information of two or more known revise bytes positioned on both sides of data, estimating phase errors of signal points of data existing among the points of data, thereby correcting the amplitude into an amplitude value of an original timing signal point,

wherein user data is recorded onto the medium without encoding it to an RLL code and, thereafter, reproduced from the medium.

20. (Currently Amended) A method according to claim 18, wherein in ~~the~~ clock extraction upon data reproduction, an inherent sampling time is obtained on the basis of phase information extracted from ~~the~~ a signal corresponding to said specific code train, and ~~the~~ a signal amplitude synchronized with the clock is sampled again by an interpolating operation of an interpolating filter according to said sampling time.

21. (Currently Amended) An information recording and reproducing method of recording and reproducing information onto/from a magnetic recording medium, comprising the steps of:

inserting a predetermined specific code train into at least two or more portions including head and last portions of data and recording the data onto the medium upon data recording; and

separating a head reproduced signal having an amplitude by using clocks and, thereafter, ~~executing a clock extraction and an amplitude correction by using a signal corresponding to said specific code train upon data reproduction~~ on the basis of phase information of two or more known revise bytes positioned on both sides of data estimating, phase errors of signal points of data existing among the points of data, thereby correcting the amplitude into an amplitude value of an original timing signal point,

wherein upon data recording, sync bytes are arranged to a head position of each data which was split by said specific code train, and the data is recorded onto the medium, and upon data reproduction, the sync bytes subsequent to said specific code train are detected, a head bit of the data is presumed, and a synchronization of a decoding is obtained.

22. (Original) A method according to claim 18, wherein upon data recording, sync bytes are inserted into said specific code train and the data is recorded onto

the medium, and upon data reproduction, the sync bytes are detected from said specific code train, a head bit of the data is presumed, and the synchronization of the decoding is obtained.

23. (Previously Presented) An information recording and reproducing method of recording and reproducing information onto/from a magnetic recording medium, comprising the steps of:

inserting a predetermined specific code train into at least two or more portions including head and last portions of data and recording the data onto the medium upon data recording; and

separating a head reproduced signal by using clocks and, thereafter, executing a clock extraction and an amplitude correction by using a signal corresponding to said specific code train upon data reproduction,

wherein upon data reproduction, a signal mean value and a standard deviation and an autocorrelation of noises are obtained by using the signal corresponding to said specific code train and used in a likelihood calculation of a data decoding.

24. (Cancelled)